

APPENDIX A1

ANNUAL ESCAPEMENT ESTIMATES FOR LOWER COLUMBIA WILD STEELHEAD STOCKS
AND HATCHERY STEELHEAD SMOLT RELEASES INTO LOWER COLUMBIA TRIBUTARIES

SOUTHWEST WASHINGTON ESU - WINTER STEELHEAD

ELOCHOMAN RIVER

Brood Year	Wild Escapement (Redd Survey)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal
							Adjustment to % of Hatchery Fish in Total Escapement
1987			1985	96447	813		
1988			1986	107053	343		
1989			1987	109830	438		
1990			1988	97995	568		
1991	166	27%	1989	105093	256	61%	28%
1992	278	44%	1990	91394	416	60%	27%
1993	378	60%	1991	114919	404	52%	21%
1994	230	37%	1992	101745	381	62%	29%
1995	132	21%	1993	97200	345	72%	39%
			1994	112955			
			1995	199333			
			1996	101104			
			1997	102070			
1991-95 Escapement Goal	237	38% 626		102070	360	61%	29%

GRAYS RIVER

Brood Year	Wild Escapement (Redd Survey)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal
							Adjustment to % of Hatchery Fish in Total Escapement
1991	716	48%	1989	45000	575	45%	17%
1992	1224	82%	1990	29900	133	10%	3%
1993	1086	73%	1991	40200	351	24%	7%
1994	704	47%	1992	48000	554	44%	16%
1995	426	29%	1993	44900	587	58%	26%
1996			1994	31600			
1997			1995	28400			
			1996	49600			
			1997	47000			
1991-95 Escapement Goal	831	56% 1486		41600	440	36%	14%

SOUTHWEST WASHINGTON ESU - WINTER STEELHEAD (Continued)

SKAMOKAWA CREEK

Brood Year	Wild Escapement (Redd Survey)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1991	NA		1989	10300	153	NA	
1992	304	134%	1990	5000	104	25%	8%
1993	258	114%	1991	5300	59	19%	5%
1994	208	92%	1992	5200	71	25%	8%
1995	92	41%	1993	7600	101	52%	22%
			1994	6000			
			1995	5100			
			1996	5100			
			1997	7007			
1992-95 Escapement Goal	216	95% 227		6680	84	30%	11%

ABERNATHY CREEK

Brood Year	Wild Escapement (Redd Survey)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1991	280	92%	1989	6300	78	22%	6%
1992	246	80%	1990	5000	52	17%	5%
1993	88	29%	1991	8500	79	47%	18%
1994	58	19%	1992	5200	44	43%	16%
1995	34	11%	1993	7600	96	74%	41%
1996			1994	7200			
1997			1995	5000			
			1996	5100			
			1997	10024			
1991-95 Escapement Goal	141	46% 306		6520	70	41%	17%

GERMANY CREEK

Brood Year	Wild Escapement (Redd Survey)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1991	NA		1989	15500	231	NA	
1992	NA		1990	8100	147	NA	
1993	216	107%	1991	10000	106	33%	11%
1994	108	53%	1992	10300	115	52%	21%
1995	42	21%	1993	10200	103	71%	38%
1996			1994	11500			
1997			1995	5000			
			1996	10500			
			1997	6998			
1993-95 Escapement Goal	122	60% 202		10820	108	52%	23%

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LOWER COLUMBIA RIVER ESU - WINTER STEELHEAD

COWEEMAN RIVER

Brood Year	Wild Escapement (Redd Survey)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1987	889	84%	1985	44217	1284	59%	27%
1988	1088	102%	1986	63477	907	45%	17%
1989	392	37%	1987	54860	349	47%	18%
1990	522	49%	1988	37105	298	36%	12%
1991			1989	42400	501		
1992			1990	44100	642		
1993	438	41%	1991	52700	517	54%	23%
1994	362	34%	1992	45200	504	58%	26%
1995	252	24%	1993	46500	490	66%	33%
1996			1994	51200			
1997			1995	29300			
			1996	40600			
			1997	41765			
1987-95	563	53%		47840	610	52%	22%
1993-95	351	33%		46180	504	59%	27%
Escapement Goal		1064					

SF TOUTLE RIVER

Brood Year	Wild Escapement (Redd Survey)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1984	836	79%	1981		0	0%	
1985	1807	171%	1982	0	0	0%	
1986	1595	151%	1983	0	0	0%	
1987	1650	156%	1984	20600	1154	41%	9%
1988	2222	210%	1985	0	296	12%	2%
1989	1371	130%	1986	40344	2488	64%	21%
1990	752	71%	1987	22344	914	55%	15%
1991	904	85%	1988	19890	1130	56%	16%
1992	1290	122%	1989	28000	825	39%	9%
1993	1242	117%	1990	22000	333	21%	4%
1994	632	60%	1991	30700	1221	66%	22%
1995	396	37%	1992	31900	1368	78%	34%
1996			1993	27700			
1997			1994	25600			
			1995	24600			
			1996	23300			
			1997	32895			
1984-95	1225	116%		19616	811	36%	15%
1991-95	893	84%		28100	976	52%	17%
Escapement Goal		1058					

Hatchery spawners are summer steelhead

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LOWER COLUMBIA RIVER ESU - WINTER STEELHEAD (Continued)

GREEN (TOUTLE) RIVER

Brood Year	Wild Index Escapement (Redd Survey)	% of Wild Escapement Index Goal	Smolt Release Year	# of Hatchery Smolts Released	Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1985	775		1982				
1986			1983				
1987	402		1984				
1988	310		1985				
1989	128		1986				
1990	86		1987				
1991	108		1988	29300	1276		
1992	44		1989	31400	895		
1993	84		1990	31800	3627		
1994	128		1991	28500	720		
1995	174		1992	28600	787		
1996			1993	25800			
1997			1994	12200			
			1995	25055			
			1996	28400			
			1997	36000			
1987-95	163						
1991-95	108			29920	1461	52%	15%

Hatchery spawners are summer steelhead

% Hatchery spawners assumed to be same as Toutle

NF TOUTLE

Brood Year	Wild Escapement (Trap Count)	% of Wild Escapement Index Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Trap count)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1989	18		1986		0	0%	0%
1990	36		1987		0	0%	0%
1991	108		1988		0	0%	0%
1992	322		1989		0	0%	0%
1993	165		1990	17100	0	0%	0%
1994	90		1991	33700	0	0%	0%
1995	175		1992	32200	0	0%	0%
1996	251		1993	27700	0	0%	0%
1997	183		1994	0	0	0%	0%
			1995	0			
			1996	25026			
			1997	30072			
1989-97	150						
1991-97	185			22140	0	0%	0%

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LOWER COLUMBIA RIVER ESU - WINTER STEELHEAD (Continued)

KALAMA RIVER

Brood Year	Wild Index Escapement (Trap Count)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Trap Count!)	% of Hatchery Fish in Total Escapement	Temporal
							Adjustment to % of Hatchery Fish in Total Escapement
1977	774	77%	1975	69881	172	18%	5%
1978	694	69%	1976	81513	921	57%	25%
1979	371	37%	1977	64505	150	29%	9%
1980	1025	103%	1978	70060	322	24%	7%
1981	2150	215%	1979	64786	620	22%	7%
1982	869	87%	1980	83182	239	22%	6%
1983	532	53%	1981	106363	342	39%	14%
1984	943	94%	1982	99501	1064	53%	22%
1985	632	63%	1983	106692	435	41%	15%
1986	919	92%	1984	94376	1613	64%	30%
1987	982	98%	1985	125150	812	45%	17%
1988	1078	108%	1986	125920	1056	49%	20%
1989	494	49%	1987	85417	215	30%	10%
1990	355	36%	1988	103945	399	53%	22%
1991	959	96%	1989	66944	329	26%	8%
1992	1973	197%	1990	93768	873	31%	10%
1993	842	84%	1991	90090	311	27%	8%
1994	725	73%	1992	93483	191	21%	6%
1995	1030	103%	1993	103246	285	22%	6%
1996	725	73%	1994	99341	881	55%	23%
1997			1995	80231			
			1996	78487			
			1997	88226			
1977-96	904	90%		91408	562	36%	14%
1991-96	1042	106%		91145	508	31%	11%
Escapement Goal		1000					

Index does not include spawners below the trap.

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LOWER COLUMBIA RIVER ESU - WINTER STEELHEAD (Continued)

EF LEWIS RIVER

Brood Year	Wild Index Escapement (Redd Survey)	% of Wild Escapement IndexGoal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1986	282	138%	1984	90108			
1987	192	94%	1985	79090	906		
1988	258	126%	1986	114300	424		
1989	140	69%	1987	98541	335		
1990	102	50%	1988	84800	55		
1991	72	35%	1989	105500	560		
1992	88	43%	1990	93100	611		
1993	90	44%	1991	141700	441		
1994	78	38%	1992	104400	628		
1995	53	26%	1993	140700	641		
1996			1994	120200			
1997			1995	135200			
			1996	105200			
			1997	106580			
1986-95	136	66%		105224	511	51%	21%
1991-95	76	37%		117080	576	51%	21%
Escapement Index Goal		204					
% Hatchery spawners based on 1980's catch data							

CEDAR CREEK (NF Lewis Tributary)

Brood Year	Wild Index Escapement (Redd Survey)	% of Wild Escapement IndexGoal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	
1996	70	21	1994	0			
1997	78	24	1995	0			
1996-97	74						
Escapement Index Goal		328					
Hatchery escapement not available for index area							

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LOWER COLUMBIA RIVER ESU - WINTER STEELHEAD (Continued)

WASHOUGAL RIVER

Brood Year	Wild Index Escapement (Redd Survey)	% of Wild Escapement Index Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Hatchery Model)	% of Hatchery Fish in Total Escapement	Temporal
							Adjustment to % of Hatchery Fish in Total Escapement
1991	114	22%	1989	129129	332		
1992	142	27%	1990	119501	1506		
1993	118	23%	1991	131256	348		
1994	158	30%	1992	113000	1347		
1995	206	40%	1993	110315	332		
1996			1994	80173			
1997			1995	102361			
			1996	107700			
			1997	118328			
1991-95 Index Escapement Goal	148	28% 520		120640	773		

Hatchery escapement not available for index area

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LOWER COLUMBIA RIVER ESU - SUMMER STEELHEAD

KALAMA RIVER

Brood Year	Wild Index Escapement (Trap Count)	% of Wild Escapement Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Trap Count)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1977	400	40%	1974	109960	1069	73%	29%
1978	1015	102%	1975	120355	3539	78%	34%
1979	484	48%	1976	94112	2120	81%	40%
1980	718	72%	1977	96217	1929	73%	29%
1981	2926	293%	1978	94752	8598	75%	31%
1982	1385	139%	1979	120380	12301	90%	57%
1983	869	87%	1980	125967	4405	84%	43%
1984	247	25%	1981	105237	908	79%	36%
1985	461	46%	1982	64776	1106	71%	26%
1986	473	47%	1983	76264	2424	84%	43%
1987	445	45%	1984	112524	4687	91%	61%
1988	848	85%	1985	93936	2199	72%	28%
1989	492	49%	1986	130054	2692	85%	45%
1990	731	73%	1987	58201	924	56%	16%
1991	704	70%	1988	59595	1034	59%	18%
1992	1075	108%	1989	85960	1588	60%	18%
1993	2283	228%	1990	68019	4905	68%	24%
1994	1041	104%	1991	89171	2797	73%	29%
1995	1302	130%	1992	92525	1741	57%	17%
1996	614	61%	1993	100892	1150	65%	22%
1997	598	60%	1994	75900	2395	80%	38%
1998	<300		1995	80100			
			1996	78000			
			1997	66289			
1977-96	926	93%		94945	3106	74%	32%
1991-96	1170	117%		87313	4815	66%	22%
Escapement Goal		1000					
1997 and 1998 data are preliminary							

EF LEWIS RIVER

Brood Year	Wild Index Escapement (Snorkel Count)	% of Wild Escapement Index Goal	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Snorkel Count)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to
							% of Hatchery Fish in Total Escapement
1996	85		1993	107800	205	71%	27%
1997	93		1994	73100	198	68%	24%
1998	61		1995	29900	98	62%	19%
			1996	77100			
			1997	42271			
1996-98	80				167	67%	23%
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LOWER COLUMBIA RIVER ESU - SUMMER STEELHEAD (Continued)

WASHOUGAL RIVER

Brood Year	Wild Index	% of Wild	Smolt Release Year	# of Hatchery Smolts Released	Estimated	% of Hatchery	Temporal
	Escapement (Snorkel Count)	Escapement Index Goal			Hatchery Escapement (Snorkel Count)	Fish in Total Escapement	Adjustment to % of Hatchery Fish in Total Escapement
1986	54		1983		2	4%	1%
1987	169		1984	118900	1	1%	0%
1988	197		1985	104600	13	6%	1%
1989	140		1986	94039	13	8%	1%
1990	156		1987	316700	4	3%	0%
1991	31		1988	239100	0	0%	0%
1992	77		1989	100100	0	0%	0%
1993	71		1990	176200	4	5%	1%
1994	49		1991	100100	0	0%	0%
1995	70		1992	121000	2	3%	0%
1996	44		1993	103100	0	0%	0%
1997	57		1994	112200	1	2%	0%
			1995	105200			
			1996	132800			
			1997	121845			
1985-97	88			133985			0%
1991-97	57			147300	1	3%	0%

Escapement Goal

Index snorkels of the NF Washougal near Skamania Hatchery indicate 87% hatchery steelhead; these totals are not included

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LOWER COLUMBIA RIVER ESU - SUMMER STEELHEAD (Continued)

WIND RIVER

Brood Year	Wild Escapement (Redd Survey)	% of Wild Escapement Goal	Wild Index Escapement (Snorkel Count)	Smolt Release Year	# of Hatchery Smolts Released	Estimated Hatchery Escapement (Snorkel Count)	% of Hatchery Fish in Total Escapement	Temporal Adjustment to % of Hatchery Fish in Total Escapement
1985	434	28%		1982	0			
1986	428	27%		1983	0			
1987	608	39%		1984	40141			
1988	826	53%		1985	43958			
1989	464	30%	274	1986	20000		48%	12%
1990	228	15%	116	1987	20276		42%	10%
1991	294	19%	123	1988	40412		51%	13%
1992	287	18%	129	1989	40400		55%	15%
1993			161	1990	20100		45%	11%
1994			104	1991	41500		56%	16%
1995	84	5%	136	1992	41000		53%	15%
1996			96	1993	40200		60%	18%
1997			106	1994	51400		60%	19%
1998			44	1995	26300		41%	10%
				1996	43372			
				1997	17786			
1985-95	457	29%			38473			
1991-95	222	14%	131		36682		51%	15%
Escapement Goal		1557						
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LOWER COLUMBIA RIVER ESU - WINTER STEELHEAD HATCHERY SMOLT RELEASES
 INTO STREAMS IN WHICH WILD ESCAPEMENTS ARE NOT MONITORED

COWLITZ RIVER

	Smolt Release Year	# of Hatchery Smolts Released
Summer	1995	401100
Steelhead	1996	406600
	1997	379284
Winter	1995	706500
Steelhead	1996	648900
	1997	621196

HAMILTON CREEK

	Smolt Release Year	# of Hatchery Smolts Released
Winter	1995	8000
Steelhead	1996	5400
	1997	5990

ROCK CREEK

	Smolt Release Year	# of Hatchery Smolts Released
Winter	1995	7000
Steelhead	1996	5000
	1997	5888

NF LEWIS RIVER

	Smolt Release Year	# of Hatchery Smolts Released
Summer	1995	117000
Steelhead	1996	122300
	1997	195722
Winter	1995	122600
Steelhead	1996	123200
	1997	125000

SALMON CREEK

	Smolt Release Year	# of Hatchery Smolts Released
Winter	1995	15500
Steelhead	1996	20200
	1997	20727